

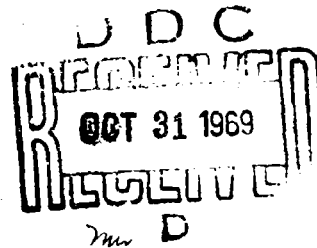
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## ALL-UNION INSTITUTE OF EXPERIMENTAL VETERINARY MEDICINE

[Following is the translation of an article by Academy Member Ya. R. Kovalenko, Lenin All-Union Academy of Agricultural Sciences (VASKhNIL), published in the Russian-language periodical Vestnik Sel'skokhozyaystvennoy Nauki (Herald of Agricultural Science) No 11, 1967, pages 128--33.]

On 31 January 1968 the All-Union Institute of Experimental Veterinary Medicine will have completed 50 years of operation. The initial activity of the Institute began in Petrograd, but at the end of 1918 was based at the then Moscow estate "Kuz'minki." By a decree of the Soviet of National Commissars, signed by V. I. Lenin on 27 February 1919, the Institute was given this estate with all the structures and stock found on it and the necessary means were released for the rebuilding and adaptation of the buildings. The mission of the newly created Institute included the development of scientifically founded methods for dealing with infectious diseases of farm animals.

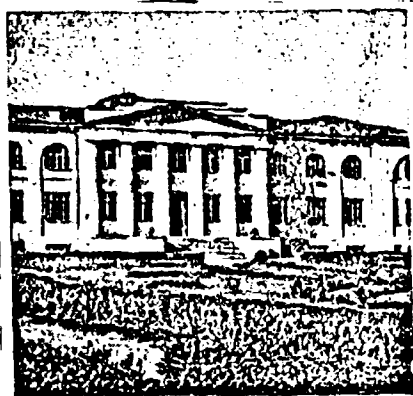
Participating in the organization of the Institute and its activities were the prominent scientists of our country: N. D. Ball, G. M. Andreyevskiy, K. I. Skryabin, S. N. Pavlushkov, D. S. Ruzhentsev, P. N. Andreyev, S. I. Drachinskiy, S. N. Vyshelesskiy, N. A. Bakh, M. I., Romanovich, L. S. Pirogov, A. P. Uranov, N. A. Soshestvenskiy, P. V. Sizov, A. V. Belitser, V. N. Matveyev, and others. Subsequently N. A. Bakh and K. I. Skryabin were selected as academy members of the USSR Academy of Sciences, and S. N. Vyshelesskiy as an active member of the Belorussian Academy of Sciences and an honorary academician of the VASKhNIL.

The Department of Animal Breeding at the Institute was initially headed by Professor S. K. Lysogorskiy, and then by Professor M. F. Ivanov and Professor Ye. F. Liskun. For a number of years the Department of Animal Propagation was headed by the famous biologist I. I. Ivanov.

At that time the country was very unsafe in respect to epizootic diseases. Rinderpest, epizootic inflammation of the lungs, glanders, anthrax, and other epizootics ruined the economy, thus being a serious national threat. The Soviet of National Commissars issued a number of decrees and resolutions concerning the struggle with epizootics.

The collective of scientists at the newly created Institute began the study of the pathology and prophylaxis of infectious and parasitic diseases and the development of measures for combatting them.

Under the severe conditions of the civil war scientists at the Institute, S. I. Drachinskiy, P. V. Sizov, S. N. Vyshellesskiy, and others with the participation of a large group of veterinarians and party and Soviet workers, organized the production of immune serum against rinderpest, and in 1923 this disease was liquidated in the European part of the USSR. Measures which were taken in subsequent years made it possible by 1928 to completely wipe out rinderpest in the Zakavkaz republics and in the Far East.



Main building at the All-Union Institute of Veterinary Medicine

The struggle with epizootic inflammation of the lungs in cattle was conducted by combining clinical investigation with specific prophylaxis (inoculation with lymph and culture) and correct diagnosis (complement fixation reaction). Removal from the herd and slaughter of sick animals, and also the inoculation of conditionally healthy animals, made it possible by 1941 to liquidate this disease in the main regions of its distribution, and subsequently - everywhere.

In prerevolutionary Russia out of 90 provinces only nine were safe in respect to glanders. In 1915 for each 10,000 horses 110--114 were infected with glanders. Particularly unsafe in this respect were the horses in the army. With the direct participation of S. N. Vyshellesskiy the corresponding investigations were conducted at the Institute. Studies were made of the morphological and biological properties of the causative agent, routes of infection, discharge of causative agent by sick animals, and improvement

of diagnosis. As a result of the scientific investigations a five-year plan was worked out for the liquidation of glanders. This was carried out with the participation of a large collective of scientific and practical workers, and by 1941 glanders was liquidated in our country. Main scientific-methodical supervision was given by scientists at the Institute - S. N. Vyshel'skiy, I. V. Poddub'skiy, B. G. Ivanov, and others.

Yearly in prerevolutionary Russia up to 35,000 animals died from anthrax and up to 15,000 persons became ill. A particularly great loss from anthrax was suffered by the reindeer economy in the North.

Participating in the study of anthrax and in the development of measures for combatting it were S. N. Vyshel'skiy, A. V. Kosarev, F. A. Terent'yev, L. D. Nikolayev'skiy, B. G. Ivanov, A. P. Zotov, and others. As a result active methods of immunization were improved and there was a sharp increase in the effectiveness of combatting the disease. Already for several decades there have been no cases of epizootics of anthrax in the country.

At the Institute investigations were conducted on tuberculosis of cattle (S. N. Vyshel'skiy, Z. S. Gazarkh, P. P. Vishnev'skiy, M. K. Yuskovets, I. V. Poddub'skiy, V. S. Kiselev, and others). Measures for combatting tuberculosis, developed by scientists at the Institute and carried out by scientific veterinary institutions and veterinarians on farms, reduced tuberculosis incidence among animals from 26.8% in 1922 to 0.7% in 1966. At present the mission is to completely wipe out this disease.

In postrevolutionary years a study was made of paratuberculosis of animals (I. V. Poddub'skiy, V. Ye. Shchurev'skiy, A. P. Alikayeva, Z. S. Gazarkh). A practicable method was recommended for incubation of the causative agent on nutrient media and its identification from other acid-resistant bacteria. For diagnosis of the disease an allergen was proposed and a paratuberculosis antigen for the complement fixation reaction. A system of measures was proposed for combatting paratuberculosis and by using this system a number of stock farms were made sanitary.

Workers at the Institute developed measures for combatting foot and mouth disease (S. N. Vyshel'skiy, A. Ya. Skomorokhov, B. G. Ivanov, L. S. Ratner, V. N. Gribanov, and others), brucellosis (S. N. Vyshel'skiy, Ye. S. Orlov, D. K. Bessonov, M. I. Chernysheva, and others), infectious anemia, and infectious equine encephalomyelitis (I. V. Poddub'skiy, B. G. Ivanov, P. M. Makarov, M. A. Semenov, A. P. Zotov, M. D. Polykov'skiy, V. I. Yakushev, and others). As a result encephalomyelitis and infectious anemia of horses were wiped out and an aluminum hydroxide vaccine was used successfully for

## Foot and mouth disease during 1952--1956.

On transplanted epithelium, taken from the tongues of slaughtered animals (by the method of Frankel), a method was developed for the multiplication of virus and preparation from it of a vaccine against foot and mouth disease (L. S. Ratner, I. Ye. Skorin, V. S. Avilov). By using this method at the Omsk Biologicals Combine they have been preparing vaccine from the type "O" virus of foot and mouth disease and it is being used with positive results. In inoculated animals the vaccine creates an immunity for 6--8 years. At the same time at the Kashintsevskaya Biologicals Plant there was a serious lack of success in the preparation of vaccine by this method, but from the type "A" virus of foot and mouth disease which was isolated in the Moscow Oblast. In a control the vaccine turned out to be insufficiently immunogenic against a virus of this same variant, but isolated in the Zakavkaz republics. These data point to immunobiological peculiarities of various variants of the foot and mouth disease virus of the same type.

For reproducing the foot and mouth disease virus for the purpose of studying it and obtaining a vaccine tests are being conducted on the use of tissue cultures, and also on the adaptation of virus of various types to the organism of rabbits, white mice, young pigs, and chicks. For determination of types and variants of virus strains, isolated during enzootic outbreaks of foot and mouth disease, V. N. Gribanov tested and modified a complement fixation reaction (CFR). This reaction is used for determination of the type of virus and its variants in materials which are practicable at the sites of development of foot and mouth disease and also in laboratory investigations of foot and mouth disease viruses. In recent years investigations have been conducted on the directed mutability of foot and mouth disease virus, interference, biochemistry, interaction of virus with the cell, purification of virus material from animal tissues, and the isolation of infectious ribonucleic acid (A. G. Malakhov, I. A. Lebedev, A. S. Okavyytyy, N. A. Litvinov, and others).

A group of scientists at the Institute (A. P. Uranov, R. A. Tsion, P. N. Andreyev, S. I. Agapov, P. S. Solomkin, S. N. Muromtsev, A. G. Bakhtin, and others) made a study of diseases of swine and recommended effective methods of diagnosis, and for prophylaxis - biological preparations. Professors P. S. Solomkin and S. N. Muromtsev were awarded government prizes for the new biological preparations proposed.

During the period of the Second World War pseudoplague of fowl was brought into our country. Urgent investigations were necessary in order to study this disease and to develop effective methods of diagnosis, prophylaxis, and measures for combatting it (P. M. Svin-tsov, A. Ya. Fomina, B. G. Ivanov, S. I. Agapov, and others).

The introduction of embryoformol aluminum hydroxide vaccine and vaccine from strain "H" / "N" when transliterated from the Cyrillic sharply increased the effectiveness of combatting pseudoplague, and in the postwar years in many republics and oblasts of the country the disease was wiped out. Since 1959 thorough investigations have been carried out in the area of studying respiratory mycoplasmosis of fowl; it was first detected by workers at the Institute (Ya. R. Kovalenko, P. I. Feoktistov, A. Ya. Fomina, A. V. Akulov) among chicks which were exported from the USA and Canada; special measures have been developed for combatting it. Other diseases of fowl have been studied and methods for eradicating them worked out.

Also anaerobic diseases of all species of animals were investigated, biological preparations proposed, and effective countermeasures developed, thus ensuring a sharp reduction in them (S. N. Muromtsev, M. D. Polykovskiy, Ya. R. Kovalenko, A. V. Lyaushkin).

Studies were made of listeriosis (P. M. Svintsov, P. S. Solomkin), Q fever (A. P. Zotov, A. A. Markov, B. G. Ivanov, M. I. Stepanova), African swine plague (Ya. R. Kovalenko, B. G. Ivanov, M. A. Sidorov, L. G. Burba), viral enteritis and swine pneumonia (A. P. Zotov, P. I. Fritulin, A. G. Bakhtin, and others), and atrophic rhinitis of swine (A. P. Zotov, P. S. Solomkin, and others).

Under the leadership of the energetic scientist Professor A. A. Markov extensive investigations are being made of parasitic blood diseases of animals. Studies are being made of the degree of distribution of trypanosomiasis, piroplasmosis, and babesiosis and the economic loss inflicted by them, and also methods of transmission of the causative agent are being exposed. An effective method has been developed for the chemical therapy of trypanosomiasis with a Soviet preparation (naganin), which made it possible by 1939 to wipe out this disease (A. V. Belitser, A. A. Markov, I. I. Kazanskiy, and others).

Very important work has been carried out on the study of the biology and clearing up of the species composition of Ixodes ticks - carriers of the causative agents of parasitic blood diseases of animals (A. A. Markov, V. A. Salyayev, A. V. Bogoroditskiy, V. I. Kurchatov, I. V. Abramov, and others). Also investigated were the interconnection between the blood parasites and their vectors, the development of blood parasites in ticks, and the importance of ticks as reservoirs of blood parasites in nature. It was established that the causative agent of babesiosis of sheep is preserved in Rhipicephalus burza ticks for 26 generations, and the causative agent of equine piroplasmosis - for 16 generations of ticks. A study of the biology of parasites in the tick-carriers made it possible to recommend a method for determining the infectious status of ticks in order

to establish the epizootological condition of pastures and their degree of danger for susceptible animals.

New carbamate compounds (sevin) were investigated for the treatment of cattle against Ixodes ticks; the preparation was recommended for wide application (V. V. Petrovskiy). Methods were recommended for the serological diagnosis of anaplasmosis and toxoplasmosis (N. I. Stepanova), methods of electron microscopy of the causative agents of parasitic blood diseases of animals have been mastered (L. P. D'yakonov, A. N. Smirnov), and the cultivation of theileria in tissue culture has been realized (V. T. Zablotskiy and B. A. Timofeyev). A study has been made of immunity in various species of animals with different diseases.

In recent years the role of passive immunity in the formation of postinfection and postvaccinal immunity has been cleared up. Following the administration of immune sera into the organism of animals or in the event of the presence of colostrum immunity in young stock the formation of vaccinal immunity is delayed and its intensity is reduced. In the event of active immunization of swine against plague and erysipelas /1/ fodder, containing an insufficient quantity of protein, the administration of certain antibiotics (penicillin, biomycin) had a negative influence on the formation of postvaccinal immunity. [Translator's note: The Russian sentence appears to be incomplete. The above translation contains every word which appears in the original language.]

The Institute assigns a great deal of attention to the study of physiology, radiobiology, biochemistry, pharmacology, and toxicology.

Physiologists are working out problems of nourishment, metabolism, and energy in normal animals and those in a pathological state; they are studying the physiology of lactation and reproduction, physiology of higher nervous activity, the cardiovascular system, composition of blood in various species of animals, and also the effect of ionizing radiation on the organism of animals (A. A. Kudryatsev, P. A. Voloskov, M. N. Andreyev, M. V. Kudryashov, I. A. Troitskiy, and others). The resulting scientific data are being used in practical recommendations.

Diseases of deficiency and metabolism are being studied by a complex of many laboratories of the Institute and outlying veterinary experimental stations. Observations of the etiology and pathogenesis of white muscle disease made it possible to recommend rational measures for its prophylaxis and treatment. During the last 7-8 years the use of sodium selenite for prophylaxis generally reduced the incidence of white muscle disease among young stock (A. A. Kudryatsev, M. N. Andreyev, S. N. Gerasimov, and others). Rational measures

have been proposed for combatting protein autointoxication in milk cows and toxic dystrophy of the liver in young pigs.

By using the method of tracer atoms, scientists cleared up the mechanism of disruption of metabolism and the development of osteomalacia in cows, sheep, chickens, and ducks; recommendations have been given for the prophylaxis and treatment of these disorders.

Since 1924 the well-known biologist I. I. Ivanov has carried out investigations on the artificial insemination and biology of reproduction of farm animals. Interesting data have been obtained on interspecies hybridization and practical methods have been developed for the artificial insemination of animals.

With the loss of the departments of animal breeding and biology of reproduction from the All-Union Institute of Experimental Veterinary Medicine (VIEV), they were transferred in 1932 to the All-Union Institute of Livestock Breeding, work continues at the VIEV on the study of infectious pathology during sterilization and abortion, and also the causes of sterility in animals, and measures are being developed for improving the breeding of animals taking into account the zonal peculiarities of the country (P. A. Voloskov, N. N. Mikhaylov, I. Ya. Chistyakov, and others).

With the participation and under the supervision of A. N. Bakh in 1922 the biochemical laboratory was created. Here investigations in veterinary science have been carried out. In recent years V. A. Engel'gardt, A. D. Zamyslov, and P. A. Nuzhdin took part in the investigations on biochemistry. They established an immunity in animals against the enzymes invertase and peroxidase and noted that the true antigen is not the active molecule of enzyme itself, but the protein substances accompanying it.

In recent years investigations have been expanded on the biochemistry of digestion in healthy animals and also in animals with diverse pathological states. Studies are being made of the chemical nature of viruses, microbes, and Protozoan causative agents of infectious diseases. Searches are being made for new biological preparations and existing ones improved, and methods for the purification of toxins are being refined (D. A. Tsuverkalov, I. I. Kucherenko, V. M. Krasov, G. M. Klimov, A. G. Malakhov, and others). The collective of this laboratory has carried out scientific-methodical work on the improvement of biochemical methods of investigation and their implementation into veterinary laboratory practice (the method of paper electrophoresis of proteins has been modified, the photometric method for determination of total protein and residual nitrogen in biochemical objects of animals has been improved, etc.).

The honored scientist Professor N. A. Scshestvenskiy, who worked at the Institute since 1922, founded Soviet veterinary pharmacology and toxicology. In collaboration with D. I. Pokhvalenskiy, L. M.



Preobrazhenskiy, A. M. Priselkov, I. A. Gusynin, A. V. Nikolayev, and others he studied the action of disinfectants and medicinal preparations on the organism of animals. Effective preparations against parasitic and infectious diseases were selected, toxicodynamics were determined for poisonings by poisonous plants and poisonous chemicals, and the prophylaxis, diagnosis, and treatment of poisonings were developed. I. A. Gusynin wrote a textbook on phytotoxicology.

Under the supervision of I. I. Kazanskiy studies were made of problems in the chemotherapy of protozoal diseases and preparations were recommended (Neodiarsenol, Osarsol, naganin, trypanin, pyraldin, barenil, etc.) for use in combatting trypanosomiasis and hemosporidiosis of horses, camels, and other animals. The use of these preparations contributed to the wiping out of trypanosomiasis.

In recent years a study was made of the toxicodynamics of phosphide, arsenic, and organic mercuric compounds and recommendations have been developed for the prophylaxis, diagnosis, and treatment of animal poisonings, and also express methods for the detection and quantitative determination of toxic chemicals in feed, water, and products of animal origin (D. D. Poloz, A. V. Nikolayev, N. I. Zhavronkov, A. N. Ardatova, etc.).

Zoohygienic investigations were developed by Professor A. K. Skorokhod'ko, who exposed the influence of various conditions of the external environment on the health and productivity of animals. In subsequent works (N. M. Komarov, V. A. Alikayev, P. S. Gromykhin, F. G. Torpakov, etc.) methods have been worked out for the investigation of the feed and blood of animals for a diagnosis of mineral and vitamin deficiency, and also investigation on a comparative evaluation of ventilation systems and normalization of air exchange in stock accommodations; the influence of air ions on the organism of animals was determined, and the optimum conditions for the restrained and unrestrained keeping of cows; mechanized methods of disinfection and disinfestation of stock accommodations have been specified. Practical recommendations have been made for all these problems. Thus veterinary laboratories are equipped with the DUK disinfection automobile installation, proposed by N. M. Komarov, and also permanent disinfection detachments have been organized. Recommendations have been made on zoohygiene and on standards for the technological planning of stock and poultry farms.

In 1957 at the Institute a laboratory of antibiotics was organized. In 1965 it was converted into the laboratory of antibiotics and mycology, which is working on the theoretical bases for the application of antibiotics and their implementation into practice. The resulting data on the antibacterial spectrum of a number of antibiotics to the causative agents of infectious diseases of animals,

establishment of the level of therapeutic concentration of preparations in their body, the experimental study of the medicinal effectiveness of the preparations - all these made it possible to recommend Biomycin as a highly effective means for combatting many diseases of young animal stock (A. Kh. Sarkisov, Kh. A. Dzhirovyan, I. S. Parfenov, etc.). The effectiveness of Biomycin exceeded many medicinal preparations, however, high cost restrained its implementation in practice. In collaboration with the collective at the plant imeni Karpova the laboratory has developed the technology of production of two biomycin preparations - biovetin and biovit, which are included in the plan for equipping the veterinary network and at present are being produced by an industrial method. The preparations have been introduced widely and are being used for paratyphoid, gastrointestinal, and pulmonary diseases of young animal stock.

The laboratory has recommended methods for using polymixin to treat gastrointestinal diseases of calves and young pigs. Jointly with the Kiev Medical Preparation Plant they have proposed an economical polymixin. They have worked out and checked under industrial conditions the high prophylactic effectiveness of an antifungal antibiotic - griseofulvin - for use in connection with trichophytia of horned cattle and fur-bearing animals and have established its high therapeutic effectiveness.

From 1920 through 1932 active scientific activity was carried out by the helminthologic department headed by Professor K. I. Skryabin. On the base of this department the All-Union Helminthology Institute imeni K. I. Skryabina (VIGIS) was organized.

The Institute carried out investigations depending on the presence of epizootics in the country. With the liquidation of cattle plague, glanders, and infectious anemia of horses and with the sharp reduction in anthrax incidence among animals the laboratories which were engaged in the study of these diseases were reorganized and new ones were created on their base.

In connection with the necessity for studying leucosis and diseases of fish and bees, in 1961 and 1962 at the Institute they created the appropriate laboratories, which not only conduct stationary investigations, but also organized scientific expeditions.

Members of the Institute have published a number of valuable monographs, books, and manuals. More than 4,000 papers have been published in journals. Thirty-four volumes of transactions of the Institute have been published, as well as a number of collections, bulletins, authors' theses, and abstracts. Since 1937 the Scientific Council has heard 72 dissertations for the degree of Doctor and 455 for the degree of Candidate of Veterinary or Biological Sciences.

Fellow workers at the Institute have taken an active part in the work of many international veterinary congresses, in sessions of the International Epizootic Service, and in international conferences and symposiums, where they have presented reports and communications on important problems of animal pathology.

Over a period of many years the Institute has been preparing scientific cadres and conducting the retraining of veterinarians.

The Institute has carried out important work in the area of methodical guidance of the scientific-research veterinary establishments.

Leading scientists of the Institute review the plans of operation of the outlying veterinary scientific establishments, give conclusions on work programs and reports, and visit the outlying scientific establishments for consultations.

Since 1930 at the Institute conferences have been held yearly for the leading specialists of all the scientific-research veterinary establishments for summing up the results of investigations, coordination of plans, and familiarization with new methods. Symposiums are held on individual theoretical problems.

Working at the Institute at the present time are 17 professors (doctors), including one academy member of the VASKhNIL, 5 honored scientists of the RSFSR, and 90 masters of veterinary and biological sciences. In post-graduate and correspondence courses 75 aspirants are being instructed; 9 candidates for master's degrees from foreign countries are being instructed.

More than once the collective from the Institute was a participant in the All-Union Agricultural Fair; in 1958 it was awarded a Diploma of the 1st degree, and in 1960 and 1964 - of the 1st and IIInd degrees. For high production indices and active participation in propaganda for achievements of the Soviet poultry industry in 1966 the Institute was presented a memorable medal. For high indices in work many workers were awarded orders and medals of the Soviet Union and also medals and diplomas from the VSKhV and VDNKh.

In the 50 years of its existence the All-Union Institute of Experimental Medicine has grown into a large scientific establishment, capable of solving complex problems of animal pathology. Several diseases of animals have been completely wiped out in the country and the distribution of others has been sharply reduced. Methods for combatting many diseases of animals which were developed by the Institute have been included in the veterinary legislation of our country, and proposed preparations are being used by practicing veterinary specialists for the mass prophylaxis, diagnosis, and treatment of animals.

In the current five-year period (1966-1970) the collective at the Institute is continuing to develop the theoretical bases and measures of prophylaxis and treatment of infectious and protozoan diseases of farm animals and is studying the mutability of microbes, viruses, and the causative agents of parasitic blood diseases; for the purpose of development and improvement of methods of diagnosis and prophylaxis of diseases studies are being made of the nucleoprotein metabolism during various pathological conditions and the causes which depress immunological reactivity in animals. Measures are being perfected for combatting tuberculosis, paratuberculosis, brucellosis, and diseases of swine and fowl. Investigations are being made of little-known diseases - leucoses, diseases caused by causative agents from the group of mycoplasmas and toxic fungi, and diseases of fish and bees. Scientific-practical bases are being improved for the prophylaxis of sterility in animals, taking into account productive-economic peculiarities; searches are being conducted for new antibiotics, methods of applying them are being developed, and their mechanism of action is being cleared up.

A study of the pharmacological action of new antimicrobial and antiparasitic means is being carried out, and also a study of the toxicodynamics of pesticides. Methods and means are being developed for the prophylaxis, diagnosis, and treatment of poisonings. The influence of ionizing radiation on the organism of animals is being cleared up, and also the etiology, pathogenesis, prophylaxis, and therapy of diseases of insufficiency. A great deal of attention is being given to the working out of zoohygienic standards for the keeping of animals on specialized farms. The study of all problems is being carried out on a high scientific level using the newest most improved methods of investigation.